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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/821,391

04/09/2004

Peter J. Hopper

100-24400 (P05844)

1592

1333

7590

02/23/2005

PATENT LEGAL STAFF  
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EXAMINER

NGUYEN, DANG T

ART UNIT

PAPER NUMBER

2824

DATE MAILED: 02/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/821,391

Applicant(s)

HOPPER ET AL.

Examiner

Dang T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8, 14 and 15 is/are rejected.
- 7) ☒ Claim(s) 5-7, 9-13 and 16-20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/9/04 & 7/27/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: Search history.

### **DETAILED ACTION**

1. This action is responsive to the following communications: the Application and the Information Disclosure Statement filed on April 9, 2004, and another Information Disclosure Statement filed on July 27, 2004.
2. Claims 1 – 20 are pending in this case. Claims 1 and 14 are independent claims.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Koyama, Pub. No. US 2003/0151686 A1, Pub. Date Aug. 14, 2003.**

**Regarding independent claim 1**, Figs. 1 and 5 of Koyama disclose a semiconductor circuit comprising: a reset transistor [2] having a drain region [drain of transistor 2], a source region [source of transistor 2], and a gate connected [gate of transistor 2] to receive a plurality of reset pulses (Fig. 2 disclosing multiple reset pulses of reset pulse signal 7 of Fig. 1); and a photodiode (Fig. 1[3]) connected to the reset transistor (Fig. 1[2]).

**Regarding dependent claim 2**, Fig. 1 of Koyama further comprising a non-volatile memory device connected to the reset transistor and the photodiode (paragraph [0076] lines 15 – 16 of Koyama teaches 20A of fig. 1 is stored in a non-volatile memory. Therefore the non-volatile memory is connected to reset transistor 2 and the photo diode 3).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 3, 4, and 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koyama, Pub. No.: US 2003/0151686 A1, Pub. Date: Aug. 14, 2003 in view of Shizukuishi, Pub. No.: US 2004/0056176 A1, Pub. Date: Mar. 25, 2004.**

**Regarding dependent claim 3**, Koyama as applied to claim 2 above disclosed every aspect of applicant's claimed invention except for the non-volatile memory device (transistor 1 with word line connected to the gate, and bit line connected to the drain) has a floating gate.

Fig. 1 of Shizukuishi discloses a nonvolatile memory element M which is made of a transistor having a source [MS] connected to the photodiode [PD], a charge storage region [CS] (*a charge storage region [CS] of non-volatile memory element has a floating gate, page 9, claim 9 lines 2-3*), a control gate [CG] and a drain [MD] (Page 3, paragraph [0051]).

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Koyama and Shizukuishi are common subject matter for a solid-state image pickup device. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Mos transistor of Koyama with the floating gate Mos transistor of Shizukuishi for the purpose of providing a solid state image pickup device suitable for being made compact (page 2, paragraph [0030]) and obtaining images signal of all pixels taken at the same time (page 2, paragraph [0029]).

**Regarding dependent claim 4,** Koyama as applied to claim 3 above, further discloses wherein the plurality of reset pulses occur during a single image capture cycle (Fig. 4 disclosing two reset pulses occur during 1 frame period).

**Regarding dependent claim 8,** Koyama as applied to claim 4 above disclosed every aspect of applicant's claimed invention except for the drain and source regions of the non-volatile memory device have a first conductivity type, and are formed in a semiconductor material of a second conductivity type, the photodiode having a region of the first conductivity type and a region of the second conductivity type, the region of the first conductivity type of the photodiode contacting the control gate of the non-volatile memory device.

Shizukuishi discloses "a first region of the first conductivity type formed in the second conductivity type . . . " (page 2, paragraph [0031]).

Koyama and Shizukuishi are common subject matter for an image pickup device. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporated Shizukuishi's conductivity type into Koyama's image device for the purpose of applying a first write voltage to the control gate of the

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first gate structure, the first write voltage being a write voltage for tunneling and writing charges into the floating gate (page 2, paragraph [0031] lines 18-21).

**5. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koyama modified by Shizukuishi as applied to claim 8 above, in further view of Tempel Pub. No.: US 2004/0042296 A1. filed on Jun 16 2003.**

Regarding to claim 9 and 10, Koyama modified by Shizukuishi as applied to claim 8 above, fails to explicitly disclose "the drain and source regions of non-volatile memory device have either a p or an n conductivity type".

Fig. 6 of Tempel discloses a non-volatile memory cell having the drain and source regions have either a p or an n conductivity type (Page 4 lines 12 – 13).

Koyama modified by Shizukuishi and Tempel are common subject matter for nonvolatile memory device. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to implement the nonvolatile memory cell of Koyama by either p type or n type conductivity for the drain and source, since within the ordinary skill of the art to select a known type p or n conductivity for a memory cell is a well known and convention in the art as has taught by Tempel (Page 4 lines 12 – 13).

#### ***Allowable Subject Matter***

6. Claims 5, 11, 12, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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The following is a statement of reasons for the indication of allowable subject matter:

**With respect to claim 5**, the primary reason for indication of allowable subject matter is that the prior art fails to teach or suggest "when a second number of photons less than the first number are collected by the photodiode, a second number of electrons are injected onto the floating gate that is greater than the first number".

**With respect to claim 11**, the primary reason for indication of allowable subject matter is that the prior art fails to teach or suggest "a second number of photons less than the first number are collected by the photodiode, a second number of electrons are injected onto the floating gate that is less than the first number".

7. Claims 14 – 20 are allowed.

**With respect to claim 14**, in addition to other elements in the claim, the prior art fails to teach or suggest "a method of collecting photons for a second period of time, the collected photons changing a magnitude of the reset voltage over the second period of time".

### ***Prior art***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Merrill et al.	Patent No. US 6,211,510 B1	Date of Patent: Apr. 3, 2001
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Lee	Pub. No.: US 2004/0217398 A1	Pub. Date: Nov. 4, 2004
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Tanzawa et al.	Patent No.: US 6,211,510 B1	Date of Patent: Apr. 3, 2001
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***Contact Information***


9. Any inquiry concerning this communication from the examiner should be directed to Dang Nguyen, who can be reached by telephone at (571) 272-1955. Normal contact times are M-F, 8:00 AM - 4:30 PM.

Upon an unsuccessful attempt to contact the examiner, the examiner's supervisor, Richard Elms, may be reached at (571) 272-1869.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, whose telephone number is (703) 305-3900. The faxed phone number for organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the Status of an application may be obtained from the patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or [EBC@uspto.gov](mailto:EBC@uspto.gov).

Dang Nguyen 2/14/2005

  
**VAN THU NGUYEN**  
**PRIMARY EXAMINER**